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LAUNCH SERVICES PROGRAM

NASA LAUNCH SERVICES PROGRAM

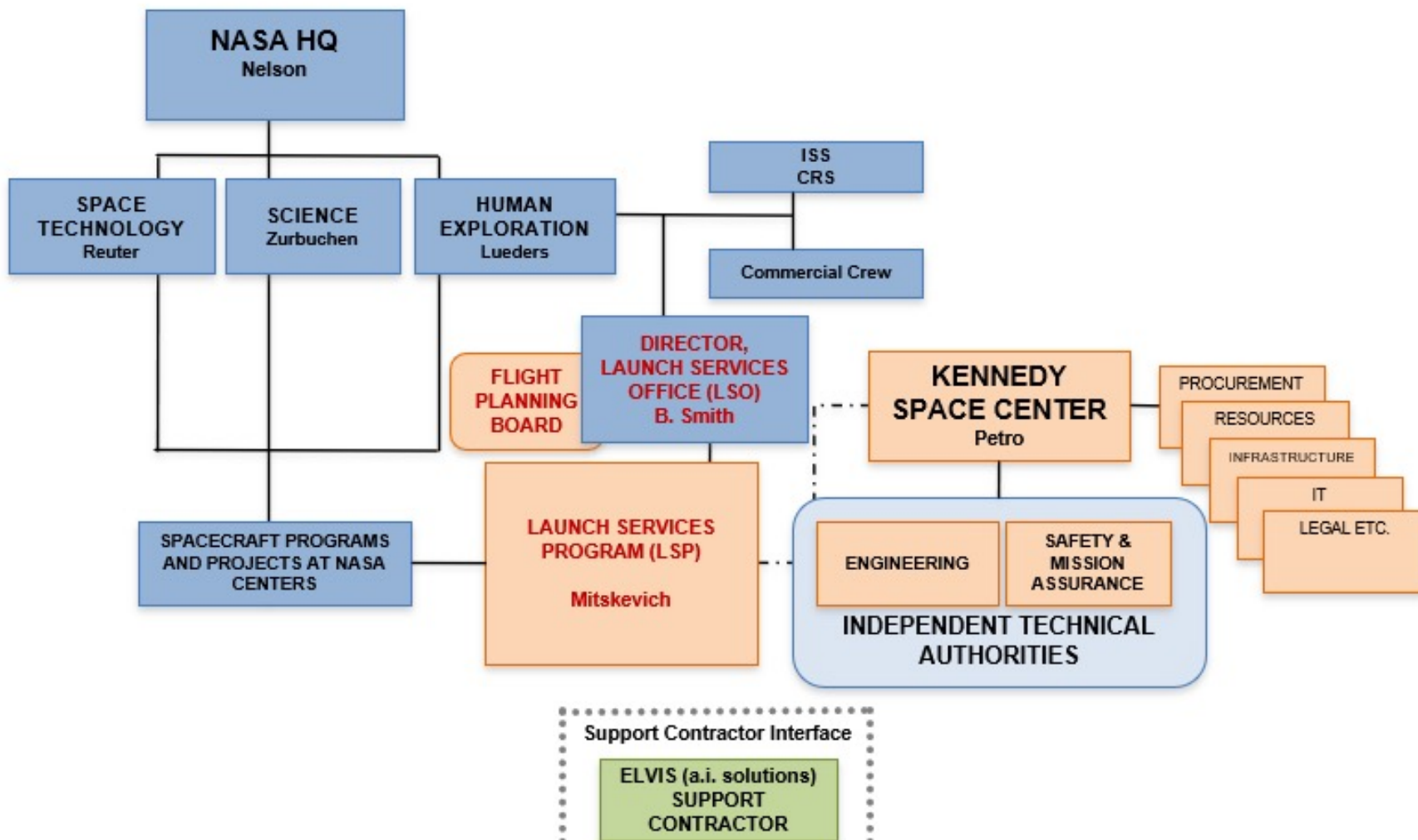
MO AO PRE-PROPOSAL CONFERENCE SEPTEMBER 14, 2021

**Shaun Daly
Flight Projects Office**



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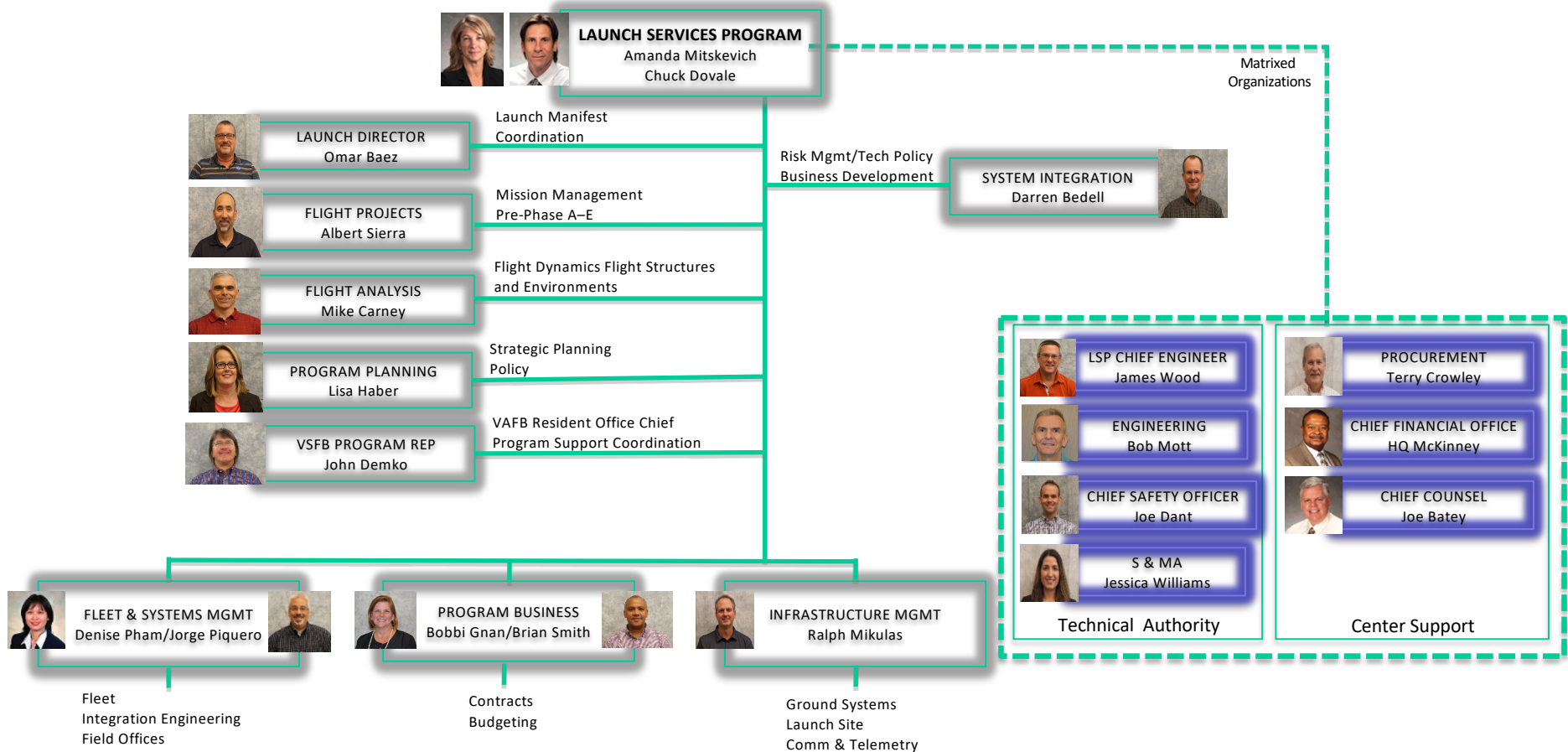
NASA Launch Services Program Relationships (NASA/HEOMD/KSC)





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LSP Organizational Structure





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NASA LSP Functional Structure



- **NASA Launch Services Program (LSP) procures/provides a Launch Service**
 - Its more than the basic launch vehicle
 - We don't buy a tail number
 - This is a commercial FFP procurement with additional insight and oversight
- **To enable this, LSP has two functional sides**
 - **Mission integration**
 - » Mission Integration Team (MIT) assigned to each mission
 - » Manages mission specific procurement, integration, and analysis
 - » Includes launch site integration and processing
 - **Fleet management**
 - » Personnel assigned to each contracted rocket
 - » Includes resident offices within the production facilities of all active providers
 - » We watch the production and performance of entire fleet – we certify the manufacture's production line, not just a particular unit (tail number)
 - » We have a say in any change/upgrade/anomaly
- **LSP maintains the final go or no-go for launch for NLS-2 procured missions**
- **Interface with Safety and Mission Assurance**
 - Safety
 - Quality



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Options available for this AO



Several options are available to proposers for the Astro MIDE X AO

- **AO-Provided Commercial FAA-Licensed Launch Services**
 - » Launch services expected to be provided under new VADR Contract
 - » Domestic launch vehicle certified as category 1 per NPD 8610.7D
 - » Modified technical oversight approach per NPD 8610.7D *Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions* will be executed for MO AO for Class D payloads.
 - » PI-Managed Mission Costs must cover services beyond standard launch service offered (see Commercial FAA-Licensed Launch Services Program Information Summary)
- **AO-Provided Rideshare Access to Space**
 - » Via ESPA/ESPA Grande as a secondary payload
 - » May utilize one or multiple ESPA ports



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Options available for this AO



Several options are available to proposers for MO AO(cont.)

- **Alternative Access to Space arrangements by PI are permitted under this AO**
 - » **PI will be required to meet NPD 8610.23C *Launch Vehicle Technical Oversight Policy***
 - » **If selected mission uses a Launch Service that is not certified to Cat 1 per NPD 8610.07D *Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions*, PI will be responsible for conducting the certification.**
 - » **LSP will not be performing an advisory role for a mission using Alternative Access to Space.**
 - **Upon award of a PI provided service, LSP will be available to answer PI questions about meaning within NPD 8610.7 and NPD 8610.23 for class D missions.**
 - **A library of FAQ's will be established over time and available to all PI's. Initially this will include any example RFP and SOW.**



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AO-Provided Commercial FAA-Licensed Launch Services LSP Procured



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Commercial FAA-Licensed Launch Services

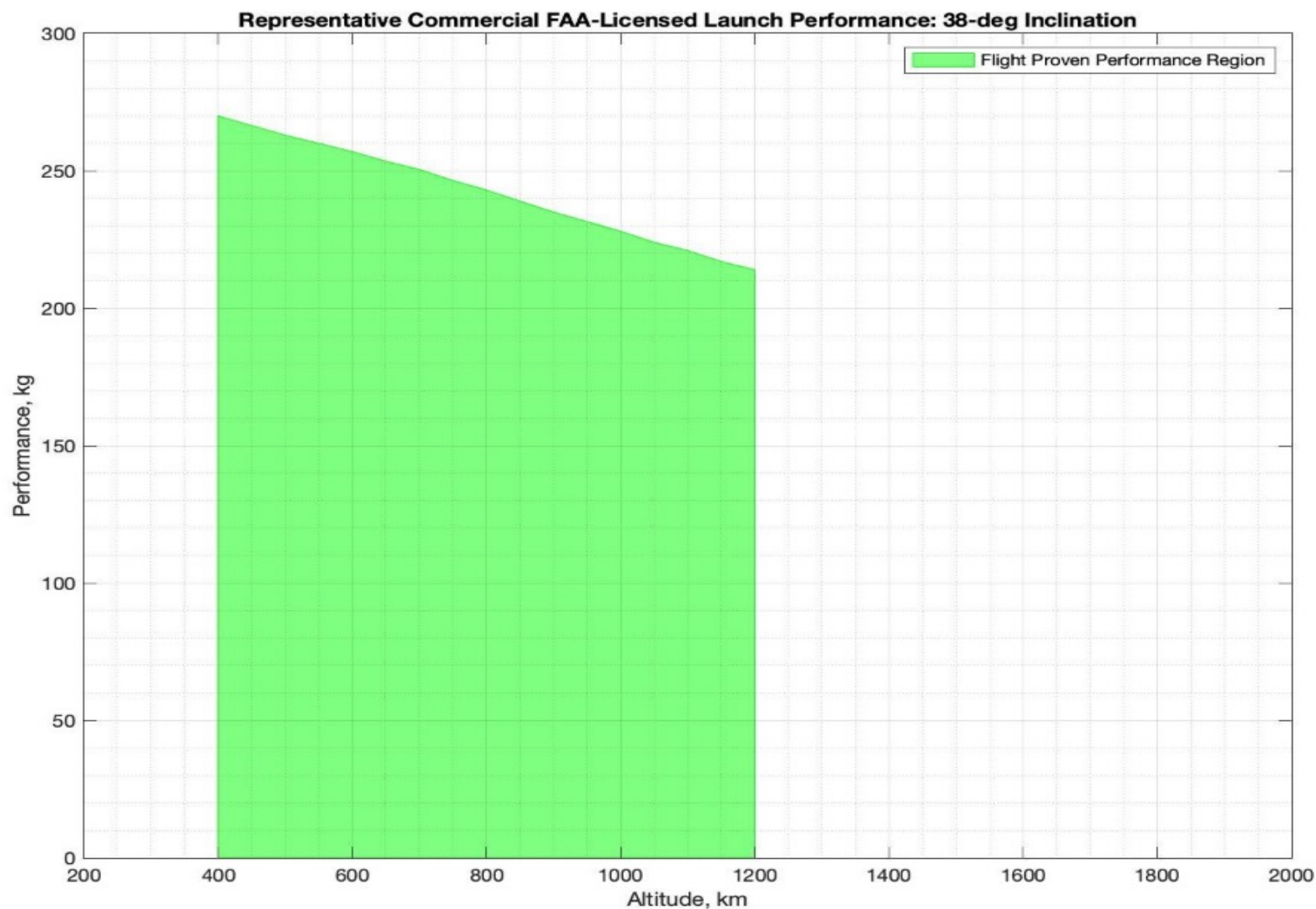


- **Assumption of a specific launch vehicle configuration as part of the AO proposal will not guarantee that the proposed LV configuration will be selected**
- **Proposers are advised to plan for compatibility with the launch vehicle summary through spacecraft Preliminary Design Review.**
 - **Payload design should accommodate the limiting/enveloping launch characteristics and capabilities included in “Commercial FAA-Licensed Launch Services Program Information Summary” document**
- **Domestic launch vehicle on its first flight will be permitted; however, prior to launch the vehicle will be certified as Category 1 per NPD 8610.7D, *Launch Services Risk Mitigation Policy for NASA-Owned or NASA-Sponsored Payloads/Missions* (see MO AO Library).**
- **A modified technical oversight approach per NPD 8610.7D Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions will be used for Class D missions.**



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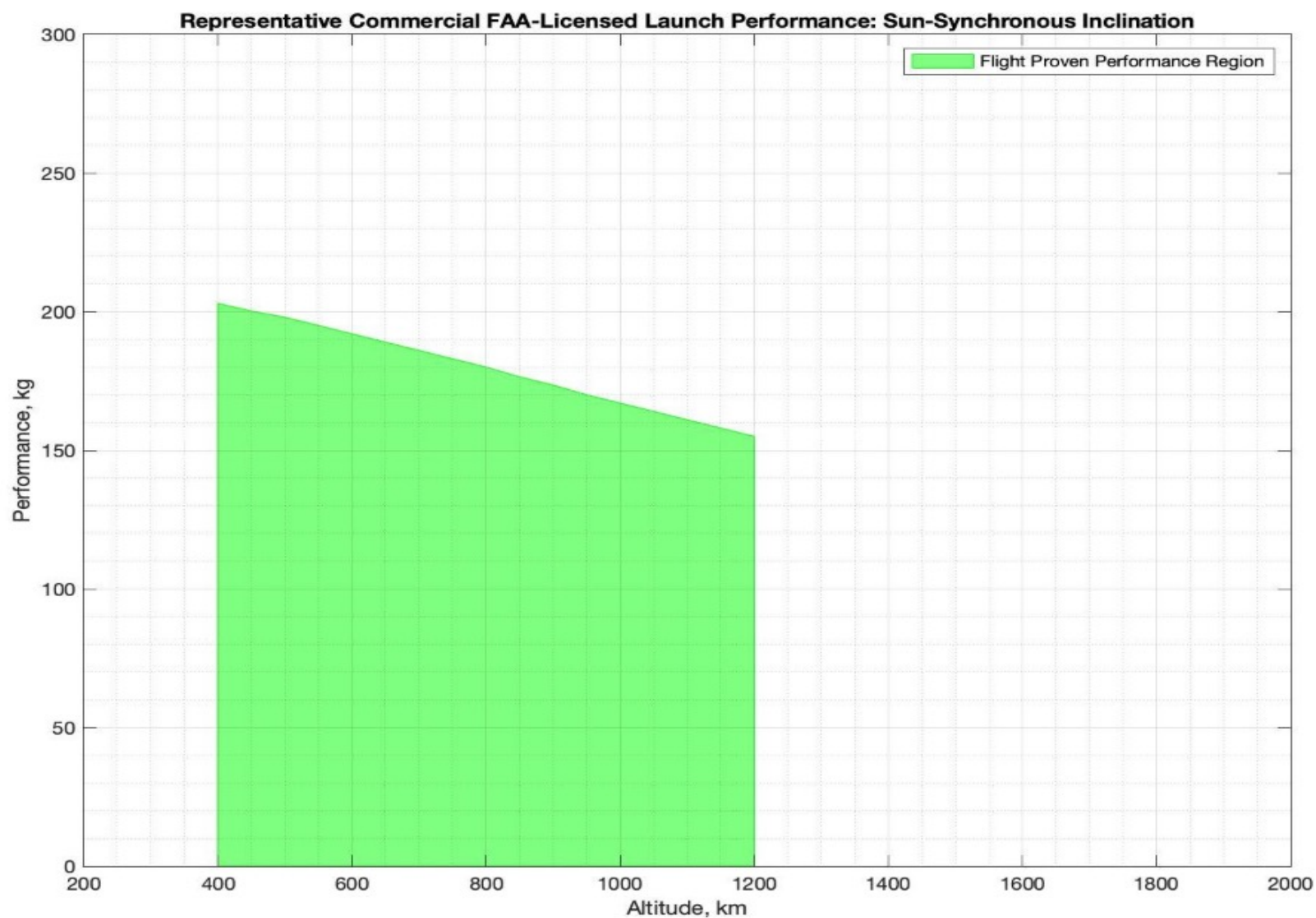
Commercial FAA-Licensed Launch Services Performance





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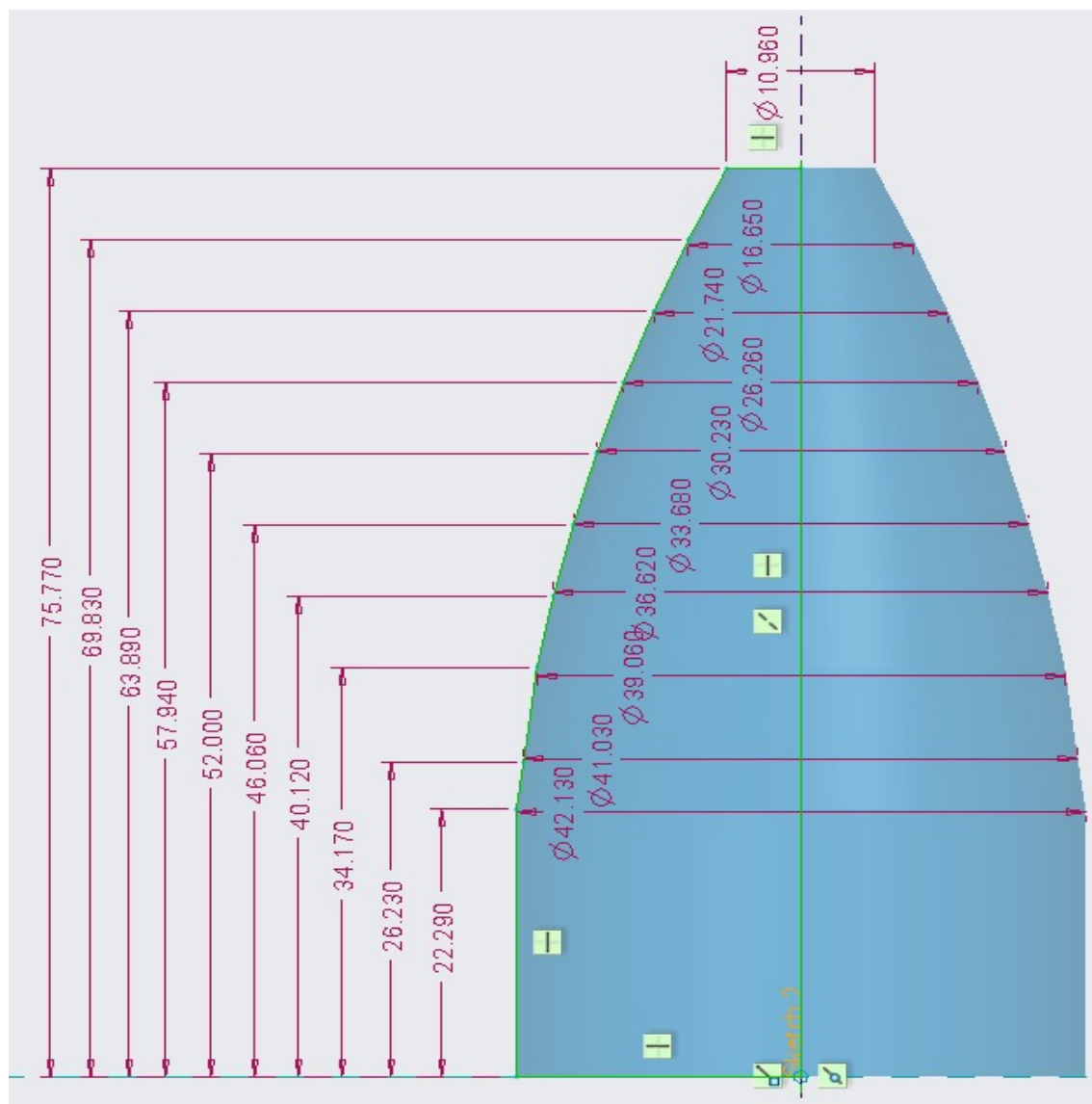
Commercial FAA-Licensed Launch Services Performance





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Commercial FAA-Licensed Launch Services Performance



- Static Fairing Envelope (in.)
- Proposals should include sufficient S/C dimensions to validate fit within this PLF static envelope, including any close approaches.



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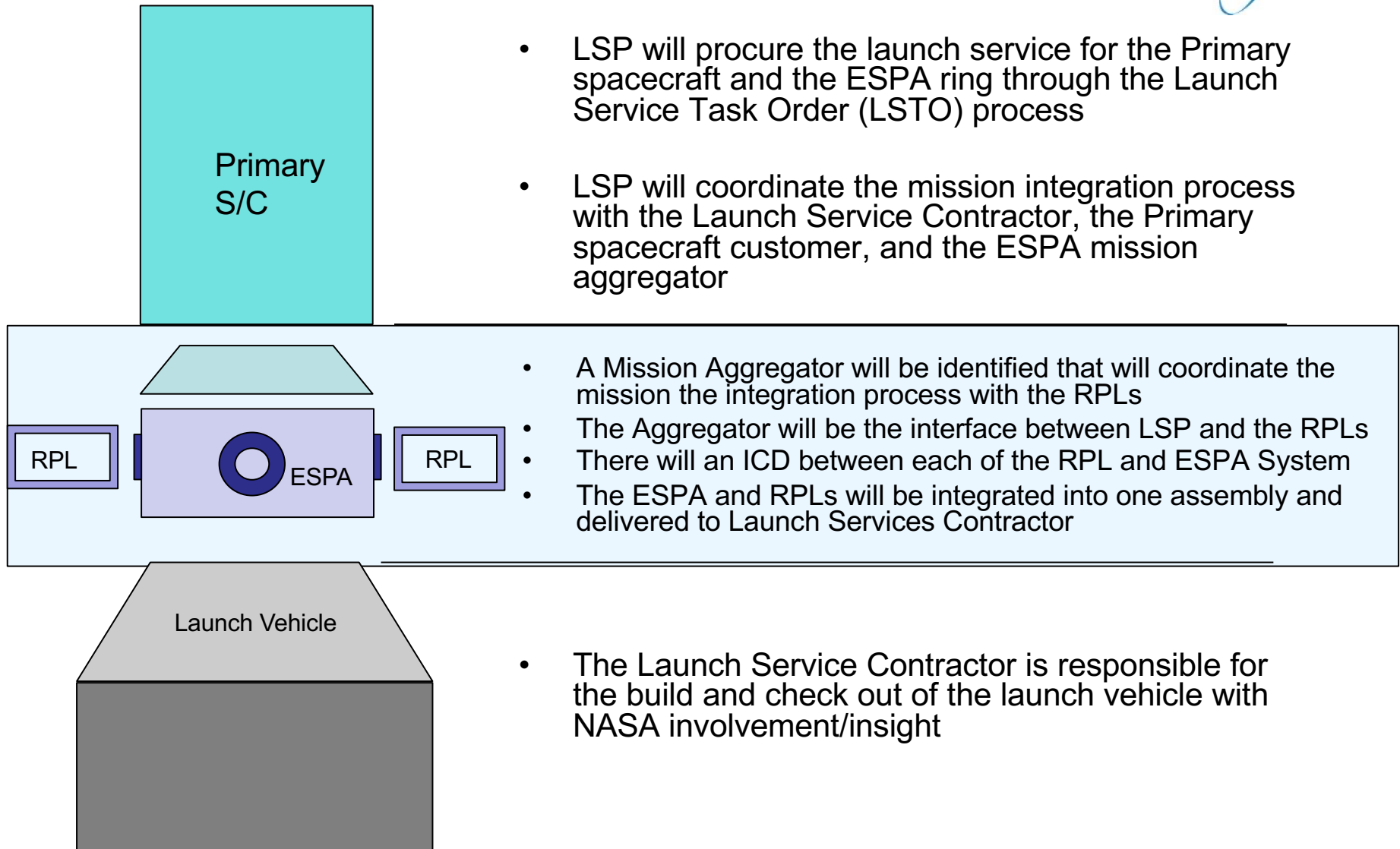


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AO-Provided Rideshare Access to Space LSP Procured

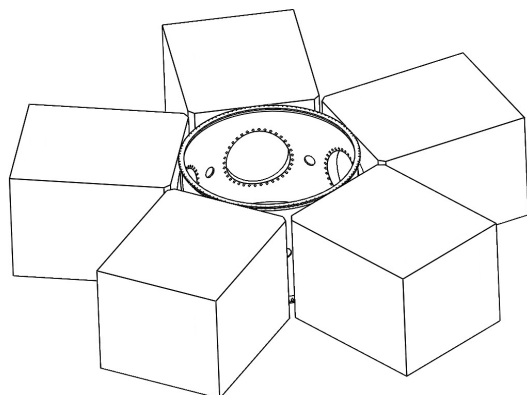


ESPA Configuration

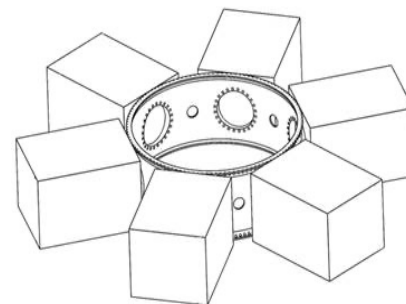




ESPA Interfaces

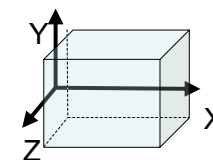


ESPA Grande



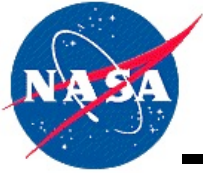
ESPA

ESPA	Max RPL Mass	Allowable RPL Volume	RPL Interface
ESPA Grande 5 Port	465 kg	42"x46"x38" Y, Z, X	24" circular
ESPA 6 Port	220 kg	24"x28"x38" Y,Z,X	15" circular



NASA will provide the Separation System as GFE: RUAG PAS 381S (15") for ESPA
 RUAG PAS 610S (24") for ESPA Grande
 PSC MkII MLB (15" or 24")

Please see the NASA Science Mission Directorate (SMD) Launch Vehicle Secondary Payload Adapter Rideshare Users Guide (updated 8/21/2020). MO AO Library

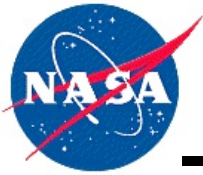


RPL Do No Harm



All ESPA class RPL will be subject to a Do-No-Harm (DNH) assessment process to ensure that they will not pose a threat to the mission success of the Primary spacecraft or Launch Vehicle (LV) – Some general DNH considerations include:

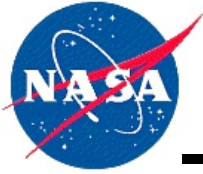
- RPL Design
 - Design should be done to Aerospace standards including appropriate safety factors for tested and untested hardware
 - Design must physically comply with the space allotted and remain constrained and sufficiently stiff to not make contact with launch vehicle or other spacecraft hardware during flight
 - Dynamic modes of the auxiliary payload must be sufficiently understood and communicated to ensure no detrimental dynamic loading onto the launch vehicle or primary spacecraft
 - RPL must maintain integrity and not separate prematurely under worst case predicted loads and environments (acoustic, shock, vibe, thermal, depressurization)



RPL Do No Harm



- Flight Risks
 - Separation analysis must ensure no re-contact with the LV, Primary spacecraft, or other RPLs during RPL separation event(s)
 - RPL separation indications must be included in the LV telemetry stream
 - Mitigations are in place to ensure any potentially hazardous functions are redundantly inhibited until well after the RPL is clear of the LV, Primary spacecraft, or other RPLs
 - RPLs must not generate debris that may contact the LV, Primary spacecraft, or other RPLs
 - RPLs contamination sources must be understood and provided to the LV, Primary spacecraft, or other RPLs for impact assessment
 - RPLs must not generate environments (e.g. thermal, separation shock, etc.) which detrimentally impacts the qualification of the LV, Primary spacecraft, or other RPLs



RPL Do No Harm



- Launch Schedule Support
 - RPL integration schedules must support launch vehicle/primary payload integration schedules
 - RPLs must not impact the launch date for the primary mission in the event that the RPL is not able to support launch date – This is typically accomplished by having a mass simulator available and ready to integrate
 - RPLs must support the full launch window defined by the primary spacecraft
- Personnel Safety
 - RPLs must comply with applicable OSHA, DOT AFSPCMAN 91-710
 - RPLs must be stable and safe without services (power, commodities) once integrated

Please see the NASA Science Mission Directorate (SMD) Launch Vehicle Secondary Payload Adapter Rideshare Users Guide (updated 8/21/2020). MO AO Library



Documents



Applicable Documents

NASA-STD-8719.24	NASA Expendable Launch Vehicle Payload Safety Requirements
2020 SMD ESPA RUG – MO AO	NASA Science Mission Directorate (SMD) Launch Vehicle Secondary Payload Adapter Rideshare Users Guide (2020 SMD ESPA RUG)
NPR 8715.6B NASA	Procedural Requirements for Limiting Orbital Debris
NASA-STD-6016	Standard Materials and Processes Requirements for Spacecraft
NPR 8715.7B NASA	NASA Payload Safety Program
2018-09-18-IMAP-ESPA-SIS	Specific Evolved Expendable Launch Vehicle Secondary Payload Adapter System Interface Specifications For Heliophysics Missions of Opportunity
ASTM E2900	Standard Practice for Spacecraft Hardware Thermal Vacuum Bakeout
IEST-STD-CC1246	Product Cleanliness Levels and Contamination Control Program

Reference Documents

(SPD-32 Rev 1)	<u>ESPA Secondary Payloads Rideshare SMD Policy Document</u>
EELV RUG	Evolved Expendable Launch Vehicle Rideshare User's Guide (SMC/LE)
TOR-2016-02946	Rideshare Mission Assurance and the Do No Harm Process –Aerospace Report
GSFC-STD-7000	General Environmental Verification Standard (GEVS) for GSFC Flight Program and Projects
MMPDS	Metallic Materials Properties Development and Standardization
MIL-HDBK-5	Military Handbook 5, Metallic Materials and Elements for Aerospace Vehicle Structures
MIL-STD-1540C	Military Standard Test Requirements for Launch, Upper-Stage, and Space Vehicles
NASA-STD-8719.24	NASA Expendable Launch Vehicle Payload Safety Requirements
EELV SIS	Evolved Expendable Launch Vehicle Standard Interface Specification
LSP-REQ-317.01B	Launch Services Program (LSP) Program Level Dispenser and CubeSat Requirements Document
AFSPCMAN 91-70	Air Force Space Command Manual 91-710, Range Safety User Requirements Manual, 1 July 2004
MIL-STD-461F	Requirements for the control of Electromagnetic Interference Characteristics of Subsystem and Equipment



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Summary



- It is the NASA Launch Service Program's goal to ensure the highest practicable probability of mission success while managing the launch service technical capabilities, budget and schedule.
- Questions must be officially submitted to:

Shaun Daly
Mission Manager
NASA Launch Services Program Code VA-C
Kennedy Space Center, FL 32899
Phone: 321-289-6426
Email: shaun.daly@nasa.gov

NASA LSP is ready to respond to your mission specific questions.



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LAUNCH SERVICES PROGRAM

Backup



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LV Applicable Q & A for this MO AO




Q-4

**Can a Launch Vehicle be purchased from non-U.S. sources using NASA funds?
Can supplies and services be purchased from non-U.S. sources using NASA funds?**

A-4

The NASA FAR Supplement (NFS) under 1835.016-70, “Foreign participation under broad agency announcements (BAAs)” item (a)(2) states that “use of a non-U.S. manufactured launch vehicle is permitted only on a no-exchange-of-funds basis”; NASA funds may not be used. Item (a)(3) states “NASA funding may not be used for subcontracted foreign research efforts. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted.”

Q-8

The PEA allows investigation teams to propose non-PEA-provided launch services where the PI arranges the required launch services for their proposed mission. Will proposed investigations be required to hold cost reserves against the cost of the launch services arranged by the PI? 

A-8

Yes. The cost of non-PEA-provided launch services is part of the PI-Managed Mission Cost and is subject to the cost reserves requirement in Section 5.6.4 of the PEA.



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LV Applicable Q & A for this MO AO



- Q-9** **A manufacturer lists a significantly higher mass limit (700 kg) in their data sheet for ESPA Grande than the maximum of 465 kg given in the SMD ESPA Rideshare Users Guide (RUG) in the MO Program Library. Is the mass limit for this acquisition more stringent than what an ESPA Grande is capable?**
- A-9** The mass capacity given in the SMD ESPA RUG reflects anticipated accommodation constraints for a secondary payload, and not only the structural limits of the ESPA ring.
- Q-10** **Are investigations deployed to cis-lunar space limited to the ‘SmallSat’ category, with a cost cap of \$40M)?**
- A-10** Yes.
- Q-11** **Are investigations using non-PEA-provided access to space limited to ‘SmallSats’ with a cost cap of \$40M?**
- A-11** The option to use non-PEA-provided access to space is available for all categories of Small Complete Mission.



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LV Applicable Q & A for this MO AO



- Q-13** **What forms of propulsion for the secondary payload would make for maximum flexibility, and which can be accommodated with more difficulty?**
- A-13 Less risky propulsion systems such as green propellant and electric propulsion would make for maximum flexibility. Hydrazine is allowed, but NASA policies with respect to pressure vessels and propulsion safety may require higher scrutiny or insight on the development of hydrazine propellant systems on rideshare payloads, to ensure safety for all the payloads.
- Q-14** **The EVM-3 AO was amended on January 22, 2021 to change the reduction in the Adjusted AO Cost Cap for proposals using Commercial FAA-Licensed Launch Services. Will a similar change be reflected in the final PEA?**
- A-14 The *Commercial FAA-Licensed Launch Services Program Information Summary* document in the MO Program Library has been updated as follows: “The cost for this launch service is to be reflected as a reduction in the Adjusted PEA Cost Cap of \$12M \$9M per launch.”